FRANCES BAGENAL
Laboratory for Atmospheric and Space Physics
University of Colorado
Boulder CO 80309-0392

PERSONAL DATA

Born: November 4, 1954 Dorchester, England
Naturalized US citizen (9/6/2001)

EDUCATION

1973-1976 University of Lancaster, BSc in Physics and Geophysics
1976-1981 Massachusetts Institute of Technology, Ph.D. in Earth and Planetary Sciences.

APPOINTMENTS

1992- Research Associate of the Laboratory for Space and Atmospheric Physics
1999- 2015 Professor, Department of Astrophysical and Planetary Sciences, University of Colorado, Boulder
1995-1996, 1997-2001, 2005-2006, 2009-2010 Associate Chair, Department of Astrophysical and Planetary Sciences
1993-1999 Associate Professor, Department of Astrophysical and Planetary Sciences
1989-1993 Assistant Professor, APS Dept., University of Colorado, Boulder
1987-1988 Visiting Scientist, High Altitude Observatory, National Center for Atmospheric Research
1985-1987 Science and Engineering Research Council Advanced Research Fellow, Space Physics Group, Imperial College, London
1982-1985 Post-Doctoral Research Assistant, Space Physics Group, Imperial College
1981-1982 Post-Doctoral Research Assistant, MIT, Center for Space Research
1977-1981 Research Assistant, Center for Space Research, MIT

AWARDS

2010 Boulder Faculty Assembly's Excellence in Research Award
2006 Fellow of the American Geophysical Union
Ten NASA Group Achievement Awards for contributions to the *Voyager*, *Galileo*, *Deep Space 1*, *New Horizons* and *Juno* missions.
2000, 2003 President's Faculty Excellence Award for Advancing Teaching and Learning through Technology, University of Colorado, Boulder

PROFESSIONAL ACTIVITIES AND SOCIETIES (past 10 years)

2009 2010 Chair of the Planetary Science Subcommittee of the Science Committee of the NASA Advisory Council
2004 2009 Chair, NASA's Outer Planet's Assessment Group
2004 2010 Editor, STATUS, newsletter of the Committee on the Status of Women in Astronomy of the American Astronomical Society
2005-2008 Astronomy Education Board, American Astronomical Society
2004-2007 Member, Committee of the Division of Planetary Science of the American Astronomical Society
2001 -2002 Member Solar and Space Physics Decadal Survey Committee for the National Research Council / National Academy of Sciences
1998 -2001 Member of the Space Studies Board for the National Research Council / National Academy of Sciences

Member of the American Astronomical Society and American Geophysical Union.

RESEARCH

Jupiter is a planet of superlatives: the most massive planet in the solar system, rotates the fastest, has the strongest magnetic field, and has the most massive satellite system. These unique properties lead to volcanoes on Io and a population of energetic plasma trapped in the magnetic field that provides a physical link between the satellites, particularly Io, and the planet Jupiter. The strong magnetic field of Jupiter traps a torus of ionized gases stripped from the volcanic atmosphere of the moon Io. Aurora are excited when accelerated particles bombard Jupiter's atmosphere. Before the Cassini mission, the magnetosphere of Saturn was thought to be smaller, weaker, and less interesting than Jupiter. But the discovery of water jetting out of cracks on the surface of the small moon Enceladus and a persistent puzzle about the planet's spin rate have shown the magnetosphere of Saturn to be just as interesting – but different. Gases from Saturn's moon Enceladus surround the planet but remain largely neutral. The smaller plasma source and weaker magnetic field of Saturn result in a smaller, less dynamic magnetosphere. I enjoy studying the environs of planets dominated by their magnetic fields – magnetospheres – because the systems are dynamic, involve a wide range of physical phenomena, and each new space mission seems to bring surprises. My growing research group studies the magnetospheres of the outer planets by combining data analysis and theoretical models. Below I describe three areas of my research.

Atmosphere-plasma interaction at Io, Enceladus and Europa: Io has been known to play a major role in the magnetosphere of Jupiter for the past 45 years but the physical mechanism remains elusive. The Galileo spacecraft measured perturbations in the magnetic field and plasma properties on seven flybys but the data have not been compared quantitatively with models. Furthermore, current models have either tackled the electrodynamics but ignored the physical chemistry of the interaction with the volcanic (mostly sulfur dioxide) atmosphere, or (e.g. my group) have concentrated on the physical chemistry but simplified the electrodynamics. When at LASP, Peter Delamere developed a physical chemistry model that took into account the major physical reactions between magnetospheric ions, electrons and neutral gasses coming from Io. RS Vincent Dols took this physical chemistry model and applied it to the a fluxtube of plasma passing through Io's atmosphere (PhD Thesis 2011). Vincent Dols has taken over Peter Delamere's hybrid code (fluid electrons, kinetic ions) which is iterated with their model of the physical chemistry. We then compare the output of their model with RS Rob Wilson's analysis of the Galileo data. Bobby Fleshman applied similar physical chemistry techniques to the plasma-atmosphere interaction at Enceladus (PhD 2012). Here the electrodynamics appear less important but the physical chemistry of the dissociation and charge-exchange of water molecules requires a simulation of the trajectories of neutral molecules and atoms, constrained by HST observations of neutral OH emissions. With the long duration of the Cassini mission (in orbit 2004-2017) it is interesting to see how the interaction and the magnetospheric plasma changes with plume activity on Enceladus.

With the next flagship mission to the outer planets selected to be a Europa orbiter, I am eager to apply these techniques to its tenuous oxygen atmosphere. In the few years Vincent Dols has been applying the hybrid code to Europa. He has been collaborating with RS Tim Cassidy (who brings expertise of Europa's sputtered atmosphere) on iterating the plasma interaction with models of the neutral atmosphere. Such interaction models will be key for evaluating what plasma measurements are needed to characterize the electrical currents arising from the external interaction.

Quantitative model of Jupiter's plasmasheet: Io spews sulfur dioxide into the magnetosphere at a rate of about a ton per second. This material is ionized by impacting electrons and swept up by Jupiter's magnetic field which couples the plasma to Jupiter's 10-hour spin. Rather than cooling on expansion into the large volume of the magnetosphere, the plasma heats up as it spreads out from the planet. The heating mechanism has remained a mystery for 30 years. I received NASA funds to compile plasma data from five Jupiter missions (Voyager 1& 2, Galileo, Ulysses and New Horizons) to develop a quantitative model of the jovian plasmadisk. Such a model will at least quantify the heating rate and provide constraints for MHD (or other) models that are being developed of the global structure and dynamics of the magnetosphere. RS Rob Wilson brings considerable experience in data analysis of similar data from the Cassini CAPS instrument. We have completed a re-analysis of Galileo plasma data and are in the process of archiving and documenting our processing of both Galileo and Cassini data. Two undergraduates (with assistance from Rob Wilson) have managed to access and process the Voyager PLS data from Jupiter and will be reanalyzing and archiving these data. These data have now been published in three papers and the raw material and programs archived.

Solar wind interaction with giant, plasma-dominated magnetospheres: The unique trajectory of the New Horizons spacecraft down the magnetotail of Jupiter (gaining a gravity assist to Pluto) showed material being ejected down the tail. Over the past decade Peter Delamere and I have developed ideas about how the solar wind interaction with the plasma-dominated magnetosphere of Jupiter could be radically different from the case at Earth. (Since Peter Delamere moved to a faculty position in Alaska we have continued to collaborate regularly). Basically, the jovian magnetosphere acts like a giant comet. We are continuing to develop these ideas, combining hybrid simulations of the Kelvin-Helmholtz shear-driven instability with our quantitative model of the magnetospheric plasma (above). This work formed the core of Mariel Desroche's PhD thesis. Graduate student Drake Ranquist is working Juno data to quantify the interaction of the solar wind with Jupiter's magnetosphere.

NASA MISSIONS

Co-Investigator: *Voyager* Plasma Science (PLS), *Galileo* (Interdisciplinary Scientist), *Deep Space 1* (PEPE), *New Horizons*, (Particles Theme Lead), *Juno* (Magnetospheres Working Group Co-Chair, Science Planning Working Group Co-Chair).

STUDENTS

Graduated PhDs: Sarah Gibson, Frank Crary, Chris Balch, David Brain, Andrew Steffl, Licia Ray, Vincent Dols, Bobby Fleshman, Mariel Desroche.

Current graduate students: Drake Ranquist

Undergraduate students: Currently we have 3 undergraduate students in the MOP group.

PRESS ARTICLES

1. The double tilt of Uranus, F. **Bagenal**, *News & Views, Nature, 321,* 809-810, 1986
2. Measuring the Io plasma torus, F. **Bagenal**, *News & Views, Nature, 327,* 460, 1987
3. Saturn's Mixed Magnetosphere, F. **Bagenal**, *Nature (News & Views), 433*, 695-6, 2006
4. NASA's New Horizons mission to Pluto, F. **Bagenal**, S.A. Stern, K. Ennico, G.R. Gladstone, W.M. Grundy, J.M. Moore, C.B. Olkin, H. A. Weaver, L.A. Young, and the New Horizons Team, COSPAR Space Research Today, vol. 195, pp. 9-20, April 2016
5. Juno Arrives at Jupiter, F. **Bagenal**, *Sky & Telescope,* July 2016
6. Jupiter Revealed, F. Bagenal, *Sky & Telescope,* November 2017

BOOKS & BOOK CHAPTERS *=first author, #=student first author

1. *Planetary magnetospheres, F. **Bagenal**, in *Solar System Magnetic Fields*, Priest (ed.), D. Reidel 1985
2. Jovian Decametric Arc Pattern and Multiple Reflection Alfven Wave Model, Y. Leblanc & F. **Bagenal**, *Planetary Radio Emissions*, Rucker, Bauer and Pedersen (eds.) 1988
3. *Torus-magnetosphere coupling, F. **Bagenal**, in *Time-Variable phenomena in the Jovian system,* M.Belton (ed.) NASA Special Publication 494, 1989
4. EUV Planetary Astronomy, P.D. Feldman & F. **Bagenal**, in *EUV Astronomy*, Malina, Bowyer (eds), Pergamon, pp252-260, 1991
5. #Modelling the large scale structure of the solar corona, S. Gibson, F. **Bagenal**, *Proceedings of the First SOHO workshop*, ESA SP-348, 1992
6. *Plasma, F. **Bagenal**, in *Enclyopedia of Planetary Sciences,* Van Nostrand Reinhold, New York, pp 624-630, 1997
7. #Modeling a simple coronal streamer during Whole Sun Month, Gibson, S. E., F. **Bagenal**, D. Biesecker, M. Guhathakurta, J.T. Hoeksema, B. J. Thompson, *Proc. of the Fifth SOHO Workshop*, ESA SP-404, 319,1997.
8. An Overview of Electrodynamic Tether Performance in the Jovian System" *Proceedings of the 1997 NASA Tether Technology Interchange Meeting,* Huntsville, September 1997
9. *Pluto's interaction with the solar wind, F. **Bagenal**, T. Cravens, J.G. Luhmann, R.L. McNutt, and A. Cheng, in *Pluto,* eds. S.A. Stern & D.J. Tholan, U. Arizona Press, pp 523-555, 1997
10. Planetary Magnetospheres, M. Kivelson and F. **Bagenal**, *Enclyopedia of the Solar System,* Academic Press, pp477-497, 1998
11. Planetary Magnetospheres and the Interplanetary Medium, J.A. Van Allen, F. **Bagenal**, in *The New Solar System* (4th edition), Eds.J. Kelly Beatty, Carolyn Collins Petersen, Andrew Chaikin, Cambridge University Press & Sky Publishing, 1998
12. Terrestrial Radio Emission: AKR, R. E. Ergun, Y.-J. Su, and F. **Bagenal**, in Planetary Radio Emissions V, editied by H. O. Rucker, M. L. Kaiser, and Y. Leblanc, Österreichischen Akademie der Wissenschaften, Vienna, Austria, p271, 2001.
13. *Chapter 1 – Introduction, Fran **Bagenal**, Tim Dowling, Bill McKinnon, in *Jupiter: Planet, Satellites, Magnetosphere*, eds. **Bagenal**, Dowling, McKinnon, Cambridge University Press, 2004
14. Chapter 21 - Magnetospheric Interactions with Satellites. Margaret G. Kivelson, Fran **Bagenal**, William S. Kurth, Fritz M. Neubauer, Chris Paranicas, Joachim Saur, in *Jupiter: Planet, Satellites, Magnetosphere*, eds. **Bagenal**, Dowling, McKinnon, Cambridge University Press, 2004

15. Chapter 23 - The Io Neutral Clouds and Plasma Torus, N. Thomas, F. **Bagenal**, T.W. Hill, J.K. Wilson, in *Jupiter: Planet, Satellites, Magnetosphere*, eds. **Bagenal**, Dowling, McKinnon, Cambridge University Press, 2004
16. Planetary Magnetospheres, M.G. Kivelson, F. **Bagenal**, in *Encyclopedia of the Solar System* (2nd edition), (eds. McFadden, Weissman, Johnson) , pp 519-540, 2007
17. Io's Neutral Clouds, Plasma Torus and Magnetospheric Interaction, N.M. Schneider, and F. **Bagenal**, in *Io After Galileo*, (ed. R. Lopes), Praxis, 2007.
18. *Comparative Planetary Environments, F. **Bagenal**, in *Heliophysics: Plasma Physics of the Local Cosmos*, C.J. Schrijver, G.L. Siscoe (eds), Cambridge University Press, pp 360-398, 2009
19. Comparative Auroral Physics: Earth and Other Planets, Barry Mauk, Fran **Bagenal**, in *Auroral Phenomenology and Magnetospheric Processes: Earth and Other Planets*, eds. Keiling, Donovan, **Bagenal**, Karlsson, AGU Chapman Monograph, #197, 2012
20. *Planetary Magnetospheres, F. **Bagenal**, in *Planets, Stars and Stellar Systems. Volume 3: Solar and Stellar Planetary Systems,* T.D. Oswalt, L. French, P. Kalas (eds.), DOI 10.1007/978-94-007-5606-9_1, Springer Dordrecht 2013
21. Solar Wind Interaction with the Giant Magnetospheres and Earth's Magnetosphere, Delamere, P.A. et al., in *Magnetotails of the Solar System,* eds. Keiling, Delamere, Jackman, AGU Chapman Monograph, 2014
22. Planetary Magnetospheres, M.G. Kivelson, F. **Bagenal**, *Encyclopedia of the Solar System, Third Edition* by D. Breuer, T. Johnson, T. Spohn, 2014
23. Jupiter, F. **Bagenal**, *Discoveries in Modern Science: Exploration, Invention, Technology*. Ed. James Trefil. Farmington Hills: Macmillan, 2015
24. Heliophysics: Active stars, their astrospheres and impacts on planetary environments, Vol IV, Eds. C.J. Schrijver, F. **Bagenal**, J.J. Sojka, Cambridge University Press, 2016
25. Solar Wind and Internally Driven Dynamics: Influences on Magnetodiscs and Auroral Response, P.A. Delamere, F. **Bagenal**, C. Paranicas, A. Masters, A. Radioti, B. Bonfond, L. Ray, X. Jia, J. Nichols, C. Arridge, in *The Magnetodiscs and Aurorae of Giant Planets*, *ISSI Space Science Series, 50*, 51-97, DOI:10.1007/978-1-4939-3395-2_4 2016

***JOURNAL PUBLICATIONS** =first author, #=student first author*

1. The behavior of the electron content during ionospheric storms: a new method of presentation and comments on the positive phase, J.K. Hargreaves & F. **Bagenal**, *J. Geophys. Res. 82*, 731, 1977
2. Plasma observations near Jupiter: initial results from Voyager 1, H.S. Bridge, J.W. Belcher, A.J. Lazarus, J.D. Sullivan, R.L. McNutt, Jr., F. **Bagenal**, J.D. Scudder, K.W. Ogilvie & E.C. Sittler, Jr., *Science 204*, 987, 1979
3. In-situ identification of various ionic species within Jupiter's magnetosphere, J.D. Sullivan & F. **Bagenal**, *Nature 280*, 798, 1979
4. Departure from rigid corotation of plasma in Jupiter's dayside magnetosphere, R.L. McNutt, J.W. Belcher, J.D. Sullivan, F. **Bagenal** & H.S. Bridge, *Nature 280*, 803, 1979
5. Plasma observations near Jupiter: initial results from Voyager 2, H.S. Bridge, J.W. Belcher, A.J. Lazarus, J.D. Sullivan, R.L. McNutt, Jr., F. **Bagenal**, J.D. Scudder, K.W. Ogilvie & E.C. Sittler, Jr., *Science 206*, 972, 1979
6. *Spatial distribution of plasma in the Io torus, F. **Bagenal**, J.D. Sullivan & G.L. Siscoe, *Geophys. Res. Lett. 7*, 41, 1980

7. Time-dependent radial diffusion in the Io plasma disk, J.D. Richardson, G.L. Siscoe, J.D. Sullivan & F. **Bagenal**, *Geophys. Res. Lett. 7*, 37, 1980
8. *Direct plasma measurements in the Io torus and inner magnetosphere of Jupiter, F. **Bagenal** & J.D. Sullivan, *J. Geophys. Res. 86*, 8447, 1981
9. Plasma observations near Saturn: initial results from Voyager 1, J.W. Belcher, A.J. Lazarus, S. Olbert, J.D. Sullivan, F. **Bagenal**, P.R. Gazis, R.E. Hartle, K.W. Ogilvie, J.D. Scudder, E.C. Sittler, A. Eviatar, G.L. Siscoe, C.K. Goertz & V.M. Vasyliunas, *Science 212*, 217, 1981
10. Ring current impoundment of the Io plasma torus, G.L. Siscoe, A. Eviatar, R.M. Thorne, J.D. Richardson, F. **Bagenal** & J.D. Sullivan, *J. Geophys. Res. 87*, 8480, 1981
11. Plasma observations near Saturn: initial results from Voyager 2, H.S. Bridge, F. **Bagenal**, J.W. Belcher, A.J. Lazarus, R.L. McNutt, J.D. Sullivan, P.R. Gazis, R.E. Hartle, K.W. Ogilvie, J.D. Scudder, E.C. Sittler, A. Eviatar, G.L. Siscoe, C.K. Goertz & V.M. Vasyliunas, *Science 215*, 563, 1982
12. Light ion densities in Jupiter's inner magnetosphere, R.L. Tokar, D.A. Gurnett, R.R. Shaw & F. **Bagenal**, *J. Geophys. Res. 86*, 2241, 1982
13. Proton concentration in the vicinity of the Io plasma torus, R.L. Tokar, D.A. Gurnett & F. **Bagenal**, *J. Geophys. Res. 87*, 395, 1982
14. *Alfven wave propagation in the Io plasma torus, F. **Bagenal**, *J. Geophys. Res. 88*, 3013, 1983
15. Long-lived particulate or gaseous structure in Saturn's outer magnetosphere? A.J. Lazarus, T. Hasegawa & F. **Bagenal**, *Nature 302*, 230, 1983
16. *Variable plasma conditions inside Io's orbit: Voyager observations, F. **Bagenal**, *J. Geophys. Res. 90*, 311, 1985
17. *Revised ion temperatures for Voyager plasma measurements in the Io torus, F. **Bagenal**, J.D. Sullivan, R.L. McNutt, J.W. Belcher & H.S. Bridge, *J. Geophys. Res. 90*, 1755, 1985
18. Plasma observation near Uranus: initial results from Voyager 2, H.S. Bridge, J.W. Belcher, B.Coppi, A.J. Lazarus, R.L. McNutt, Jr., S. Olbert, J.D. Richardson, M.R. Sands, R.S. Selesnick, J.D. Sullivan, R.E. Hartle, K.W. Ogilvie, E.C. Sittler, Jr., F. **Bagenal**, R.S. Wolff, V.M. Vasyliunas, G.L. Siscoe, C.K. Goertz & A.Eviatar, *Science 233*, 89-93, 1986
19. *The Uranus Bow Shock: Voyager 2 Inbound Observations of a High Mach Number Shock, F. **Bagenal**, J.W. Belcher, E.C. Sittler, Jr.& R.P. Lepping, *J. Geophys. Res. 92*, 8603, 1987
20. *Io's Alfven Wave Pattern and the Jovian Decametric Arcs, F. **Bagenal** & Y. Leblanc, *Astron. & Astrophys. 197*, 311, 1988
21. On the energy crisis in the Io plasma torus, R.A. Smith, F. **Bagenal**, A.F. Cheng & D.F. Strobel, *Geophys. Res. Lett. 15*, 545, 1988
22. Planetary Science with LYMAN," M.C. Festou & F. **Bagenal**, in *Compte Rendu des Journees de Planetologie*, Festou and Chabod (eds.), Observaoire de Besancon, 1988
23. Electrostatic Waves in the Bow Shock at Uranus, S.L. Moses, F.V. Coroniti, C.F. Kennel, F. **Bagenal**, R.P. Lepping, K.B. Quest, W.S. Kurth & F.L. Scarf, *J. Geophys. Res,94,* 13,367, 1989
24. *Pluto's interaction with the solar wind, F. **Bagenal** & R.L. McNutt Jr., *Geophys. Res. Lett., 16,* 1229, 1989
25. Plasma Observations Near Neptune: Initial Results from *Voyager 2*, J.W. Belcher, H.S. Bridge, F. **Bagenal**, B. Coppi, O. Divers, A. Eviatar, G. Gordon, A. Lazarus, R.L. McNutt, K. Ogilvie, J. Richardson, G. Siscoe, E. Sittler, J. Steinberg, J. Sullivan, A. Szabo, L. Villanueva & V. Vasyliunas, M. Zhang, *Science, 246*, 1478, 1989

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27. Observation of auroral secondary electrons in the Jovian magnetosphere, R.L. McNutt Jr., F. **Bagenal** & R.M. Thorne, *Geophys. Res. Lett., 17,* 291, 1990
28. *Modeling the Large-Scale Structure of the Solar Corona, F. **Bagenal** & S. Gibson, *J. Geophys. Res*, *96,* 17663-17674, 1991
29. *The Abundance of O^{++} in the Jovian Magnetosphere, F. **Bagenal**, D.E. Shemansky, R.L. McNutt, R. Schreier & A. Eviatar, *Geophys. Res. Lett.,19,* 79-82, 1992.
30. *Giant Planet Magnetospheres, F. **Bagenal**, *Ann. Rev. Earth & Planet. Sci.,* 20, 289, 1992.
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32. Extreme Ultraviolet Explorer satellite observations of the Io plasma torus, D.T. Hall, G.R. Gladstone, H.W. Moos, F. **Bagenal**, J.T. Clarke, P.D. Feldman, M.A. McGrath, N.M. Schneider, D.E. Shemansky, D.F. Strobel, J.H. Waite, *Ap. J., 426,* L51-54, 1994
33. *Empirical model of the Io plasma torus: I Voyager measurements, F. **Bagenal**, *J. Geophys. Res., 99,* 11043-11062, 1994
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35. ROSAT Observations of the Jupiter aurora, J.H. Waite, F. **Bagenal**, F. Seward, C.Na, G.R. Gladstone, T.E. Cravens, K.C. Hurley, J.T. Clarke, R. Elsner, and S.A. Stern, *J. Geophys. Res., 99,* 14799-14809, 1994
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37. Analytical model for the density distribution in the Io plasma torus, Y. Mei, R.M. Thorne, and F. **Bagenal**, *J. Geophys. Res., 100,* 1823-1828, 1995.
38. A comparison of the Voyager 1 UVS and PLS measurements of the Io plasma torus, M.H. Taylor, F. **Bagenal**, N.M. Schneider, B.R. Sandel, D.E. Shemansky, P. L. Matheson, *J. Geophys. Res., 100,* 19541-19550, 1995.
39. *Planetary magnetospheres: 1991-1993, F. **Bagenal**, *Surveys in Geophys. 16,* 443-456, 1995
40. #The Large Scale Magnetic Field and Density Distribution in the Solar Minimum Corona, Gibson, S., and F. **Bagenal**, *J. Geophys. Res.,* 100, 19865-19880, 1995.
41. #Current sheets in the solar minimum corona, S.E. Gibson, F. **Bagenal** and B.C. Low, *J. Geophys. Res., 101*, 4813-4823, 1996.
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45. *The ionization source near Io from Galileo wake data, F. **Bagenal**, *Geophys. Res. Lett., 24,* 2111-4, 1997
46. #Coupling the plasma interaction at Io to Jupiter's decametric emission, F.J. Crary, F. **Bagenal**, *Geophys. Res. Lett., 24,* 2135-8, 1997
47. *Introduction to the special section: Magnetospheres of the outer planets, F. **Bagenal**, *J. Geophys. Res., 103,* 19841-2, 1998

48. #Galileo plasma spectrometer measurements of composition and temperature in the Io plasma torus, F.J. Crary, F. **Bagenal**, L.A. Frank, W.R. Paterson, *J. Geophys. Res., 103*, 29,359-71, 1998.
49. #Remanent ferromagnetism and internal structure of Ganymede, F.J. Crary and F. **Bagenal**, *J. Geophys. Res., 103*, 25,757-73, 1998
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51. #Ion cyclotron waves, pickup ions, and Io's neutral exosphere, F. Crary, F. **Bagenal**, *J. Geophys. Res., 105*, 25,279-89, 2000
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54. Modeling variability of plasma conditions in the Io torus, Delamere, P.A. and F. **Bagenal**, *J. Geophys. Res., 108,* 1276, 2003.
55. Momentum transfer between the Io plasma wake and Jupiter's ionosphere, Delamere, P.A., F. **Bagenal**, R. Ergun and Y.-J. Su, *J. Geophys. Res., 108,* 1241, 2003.
56. Io-related Jovian auroral arcs: Modeling parallel electric fields, Su, Yi-Jiun and R.E. Ergun, F. **Bagenal**, P. A. Delamere, *J. Geophys. Res*., *108,* 1094, 2003
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PRESENTATIONS – 2016 only, as example

Juno mission to Jupiter – Chatauqua public talk – Jan 11, 2016
NASA's New Horizons mission to Pluto – (invited) American Meteorological Society, New Orleans, Jan 13, 2016
NASA's New Horizons mission to Pluto – IGPP Seminar at UCLA, Los Angeles, Feb 19, 2016
NASA's New Horizons mission to Pluto – HAO/UCAR, Boulder, Feb 24, 2016
NASA's New Horizons mission to Pluto – Astronomy on Tap, Boulder Mar 6, 2016
Pluto the Pugnacious Planet – LASP public talk – Mar 2, 2016
NASA's New Horizons mission to Pluto – Longmont Astronomical Society, Mar 17, 2016
NASA's New Horizons mission to Pluto – Denver Museum of Nature & Science, Mar 31, 2016
NASA's New Horizons mission to Pluto – MIT Alumni Club, Denver, Apr 6, 2016

NASA's New Horizons mission to Pluto – Front Range Community College, Fort Collins, Apr 8, 2016
NASA's New Horizons mission to Pluto – Physics Dept., University of South Dakota, Sioux Falls, Apr 11, 2016
Pluto the Pugnacious Planet - Lunar & Planetary Lab, U of Arizona, Tucson, Apr 26, 2016
NASA's Juno mission to Jupiter - Lunar & Planetary Institute, Houston, TX Apr 28, 2016
Pluto the Pugnacious Planet - CU Outreach, Fiske Planetarium, Apr 30, 2016
NASA's Juno mission to Jupiter – Physics Dept, University of Toronto, Canada, May 17, 2016
NASA's New Horizons mission to Pluto – public talk, University of Toronto, Canada, May 18, 2016
NASA's Juno mission to Jupiter – LASP Seminar, U of Colorado, Jul 27, 2016
NASA's Juno mission to Jupiter – Physics Dept, University of Sydney, Australia, Sep 22, 2016
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DPS - 103.01. New Horizons: Overview of Results From and Plans After the Exploration of The Pluto System
S. A. Stern; Harold A. Weaver; Catherine B. Olkin; Leslie Young; Kimberly Ennico; Jeffrey M. Moore; John R. Spencer; William B. McKinnon; Will Grundy; Randy Gladstone; Dale P. Cruikshank; Fran Bagenal; Michael Summers
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DPS - 402.04. Io Plasma Torus Ion Composition: Voyager, Galileo, Cassini
Fran Bagenal; Edward Nerney; Andrew J. Steffl
DPS - 429.08. Sputtering of the Europa surface by thermal ions from the torus and pickup ions in a diverted flow
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P21E-03: Response of Jupiter's Aurora to Plasma Mass Loading Rate Monitored by the Hisaki Satellite During Io's Volcanic Event, Kimura et al.
U22A-01: Initial observations of Jupiter's aurora from Juno's Ultraviolet Spectrograph (Invited), Gladstone, et al.
U22A-03: First Results from the Jupiter Energetic Particle Detector Instrument (JEDI) Investigation Within the Magnetosphere and Over the Poles of Jupiter (Invited), Mauk et al.
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